Materials Technology

Academic Year: (2020 / 2021) **Review date: 26-07-2020**

Department assigned to the subject: Materials Science and Engineering and Chemical Engineering Department

Coordinating teacher: VELASCO LOPEZ, FRANCISCO JAVIER

Type: Compulsory ECTS Credits : 3.0

Year : 3 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Materials Science and Engineering

OBJECTIVES

By the end of this subject, students will be able to have:
1. A systematic understanding of the key aspects and concepts of technology of materials, through the relationship among processing, structure and properties of different materials.
2. A coherent knowledge of their branch of engineering including some at the forefront of the branch, to develop technologies in areas where processing, structure and properties can be related.
3. Awareness of the wider multidisciplinary context of engineering, opening concepts of technology of materials for their relationship to other areas.
4. The ability to apply their knowledge and understanding to identify, formulate and solve engineering problems of technology of materials using established methods, explaining the performance of materials in different working areas.
5. The ability to design and conduct appropriate experiments of technology of materials, interpret the data and draw conclusions.
6. Workshop and laboratory skills of technology of materials.
7. The ability to combine theory and practice to solve problems related to technology of materials.
8. An awareness of the non-technical implications of engineering practice in the field of technology of materials.

DESCRIPTION OF CONTENTS: PROGRAMME

-Materials technology and the consequences on final properties. Main manufacturing processes of metals, ceramics and polymers. Effect on microstructure and properties
- Metals. Casting and microstructure development.
- Metals. Basics of plastic deformation.
- Welding. Defectology. Inspection and testing.
- Powder Technology. Ceramic Materials Processing.
- Polymers and manufactures methods.
- In-Service behavior: fracture, fatigue, creep, corrosion and wear.
- Surface treatments. How to increase the component performance

LEARNING ACTIVITIES AND METHODOLOGY

Masterly classes, classes to solve doubts in reduced groups, student presentations, individual tutorship and personal work of the student; oriented to acquire theoretical knowledge.

Laboratory classes, classes for solving problems in reduced groups; individual tutorship and personal work of the student; oriented to acquire practical knowledge related to subject program.

ASSESSMENT SYSTEM

The evaluation will be composed of a final written exam (worths 40% of the final mark) and a continuous evaluation. It is mandatory to achieve a minimum mark of 3.5/10 in the final written exam. Besides, laboratory practices are mandatory for being assessed.

The continuous evaluation will have at least the following items:

(i) Tests: Individual tests during the course.
(i) Work in groups: at least one collaborative work will be issued during the course.
(iii) Laboratory: Two laboratory practices, solving a questionnaire or test at the beginning of the lab

session regarding to the laboratory instructions (to assess the prior preparation from the student). In addition, a final report an/or a final test, regarding lab practices, will be evaluated.

The assistance to the laboratory sessions is MANDATORY. The entrance to the laboratory is enabled once the student has watched the general security video and the specific video for chemistry/materials lab and answered both tests correctly. THE STUDENT CAN NOT ENTER THE LABORATORY IF HE/SHE HAS NOT ANSWERED THE TESTS. THE NON-ASSISTANCE TO THE LABORATORY WITHOUT JUSTIFIED CAUSE IMPLIES SUSPENDING THE CONTINUOUS EVALUATION.

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY

- Kalpakjian, Schmid Manufacturing Engineering & Technology , Pearson Education, 2005

- M.F. Ashby, D.R.H. Jones. Engineering Materials (1 & 2): An Intro. to Microstructures, Processing and Design, Elsevier, 2006

- M.P. Groover Fundamentals of Modern Manufacturing: MaterialsProcessesandSystems, Pearson Edu., 2010